

Listing of Claims

This listing of claims replaces all prior versions and listings of claims in the application:

1. (Currently Amended) A method comprising:
determining a beat-to-beat variability in cardiac electrical activity;
determining a an average relevance of the variability over a collection of beats to one of atrial fibrillation and atrial flutter using a non-linear statistics; and
identifying one of an atrial fibrillation event and an atrial flutter event based on the determined relevance, the event being a period in time when the information content of the cardiac electrical activity is of increased relevance to one of atrial fibrillation and atrial flutter.
2. (Currently Amended) The method of claim 1, further comprising identifying the end of the event based on the determined average relevance.
3. (Original) The method of claim 1, further comprising transitioning into an event state associated with atrial fibrillation in response to identification of the event.
4. (Original) The method of claim 1, further comprising transmitting the event to a remote receiver from an ambulatory patient.

5. (Currently Amended) The method of claim 1, wherein determining the average relevance of the variability ~~to atrial fibrillation~~ comprises:

receiving information identifying a ventricular beat; and

assigning a preset value indicating that the variability is negatively indicative of atrial fibrillation.

6. (Original) The method of claim 5, further comprising identifying a ventricular tachycardia event based at least in part on the information identifying the ventricular beat.

7. (Currently Amended) The method of claim 1, wherein determining the average relevance of the variability over a collection of beats ~~to atrial fibrillation~~ comprises determining an average relevance of variability in a collection of R to R intervals.

8. (Original) The method of claim 1, wherein determining the beat-to-beat variability comprises determining the beat-to-beat variability in a series of successive beats.

9. (Original) The method of claim 8, wherein determining the beat-to-beat variability in a series of successive beats comprises determining the variability in an interval between successive R-waves.

10. (Currently Amended) The method of claim 1, wherein identifying the event comprises comparing the average relevance of the variability to a first predetermined amount of relevance.

11. (Original) The method of claim 10, further comprising comparing the relevance of the variability in the event to a second predetermined amount of relevance to identify the end of the event, the second predetermined amount being lower than the first predetermined amount.

12. (Currently Amended) A method comprising:
collecting information describing the variability in heart rate over a series of beats;
designating variability at a lower end of physiological values as being substantially irrelevant to atrial fibrillation by weighting information that describes the lower end variability with a first weighting factor;

designating variability in a midrange of physiological values as being positively indicative of atrial fibrillation by weighting information that describes the midrange variability with a second weighting factor;

designating variability in an upper range of physiological values as being negatively indicative of atrial fibrillation by weighting information that describes the upper range variability with a third weighting factor; and

determining a relevance of the weighted variability described in the collection of information to atrial fibrillation.

13. (Currently Amended) The method of claim 12, wherein ~~designating the variability~~ weighting the information comprises multiplying the information ~~describing the variability~~ by a weighting factor.

14. (Original) The method of claim 12, wherein collecting the information comprises collecting information describing a variability in R to R intervals over a series of beats.

15. (Original) The method of claim 14, wherein collecting the information describing the variability comprises collecting information that is a function of a ratio of a first R to R interval and an immediately preceding R to R interval.

16. (Original) The method of claim 15, wherein collecting the information describing the variability comprises collecting information related to factor $DRR(n)$ as given by

$$DRR(n) = ABS\left(\frac{RR(n, n-1)}{RR(n, n-1) + RR(n-1, n-2)} - \frac{1}{2}\right).$$

17. (Original) The method of claim 16, wherein designating the variability at the lower end of physiological values as being largely irrelevant comprises designating information related to factors $DRR(n)$ less than about 0.02 as being largely irrelevant.

18. (Original) The method of claim 16, wherein designating the variability at the midrange of physiological values as being indicative of atrial fibrillation comprises designating information related to factors $DRR(n)$ greater than about 0.02 and less than about 0.15 as being indicative of atrial fibrillation.

19. (Original) The method of claim 16, wherein designating the variability at the upper range of physiological values as being negatively indicative of atrial fibrillation comprises designating information related to factors $DRR(n)$ greater than about 0.157 as being negatively indicative of atrial fibrillation.

20. (Original) The method of claim 12, wherein collecting the information describing the variability comprises collecting the variability in heart rate over a series of between 20 and 200 of the recent R to R intervals.

21. (Original) The method of claim 12, wherein determining the relevance of the variability comprises determining the relevance of the variability to sustained atrial fibrillation.

22. (Original) The method of claim 12, wherein the series of R to R intervals is a continuous series of R to R intervals.

23. (Previously Presented) A method comprising:

- comparing recent R to R intervals with preceding R to R intervals to yield a collection of comparisons;
- weighting the comparisons according to a likelihood that the comparisons are relevant to atrial fibrillation, the weighting including
 - identifying a beat of a collection of recent beats as a ventricular beat, and
 - assigning a preset value to weight the beat in the collection, the preset value being negatively indicative of atrial fibrillation; and
- determining the average relevance of the collection to atrial fibrillation.

24. (Original) The method of claim 23, wherein weighting the comparisons comprises:
designating variability at a lower end of physiological values as being largely irrelevant
to atrial fibrillation; and

designating variability in a midrange of physiological values as being indicative of atrial
fibrillation.

25. (Original) The method of claim 23, wherein weighting the comparisons comprises
designating variability in an upper range of physiological values as being negatively indicative of
atrial fibrillation.

26. (Original) The method of claim 23, further comprising identifying a ventricular
tachycardia event based at least in part on the identification of the ventricular beat.

27. (Original) The method of claim 23, wherein comparing comprises comparing recent
R to R intervals with immediately preceding R to R intervals to yield a collection of
comparisons.

28. (New) A method comprising:
collecting information describing the variability in heart rate over a series of beats,
wherein the collected information is related to factor $DRR(n)$ as given by

$$DRR(n) = ABS\left(\frac{RR(n, n-1)}{RR(n, n-1) + RR(n-1, n-2)} - \frac{1}{2}\right);$$

designating variability at a lower end of physiological values as being substantially
irrelevant to atrial fibrillation;

designating variability in a midrange of physiological values as being positively indicative of atrial fibrillation;

designating variability in an upper range of physiological values as being negatively indicative of atrial fibrillation; and

determining a relevance of the variability described in the collection of information to atrial fibrillation.

29. (New) The method of claim 28, wherein designating the variability at the lower end of physiological values as being largely irrelevant comprises designating information related to factors DRR(n) less than about 0.02 as being largely irrelevant.

30. (New) The method of claim 28, wherein designating the variability at the midrange of physiological values as being indicative of atrial fibrillation comprises designating information related to factors DRR(n) greater than about 0.02 and less than about 0.15 as being indicative of atrial fibrillation.

31. (New) The method of claim 28, wherein designating the variability at the upper range of physiological values as being negatively indicative of atrial fibrillation comprises designating information related to factors DRR(n) greater than about 0.157 as being negatively indicative of atrial fibrillation.